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Development of visual perception in the pre-school child

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THE DEVELOPMENT OF VISUAL PERCEPTION

IN THE PRE-SCHOOL CHILD

by

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CHAPTER I

INTRODUCTION

Significance of Problem

> Vision and visual perception are the end result of all other developments, not the starting point. If they were the starting point, every infant would fully understand everything he saw following the moment of birth. There would be no need for the long involved learning processes. Neither would there be the need for the long periods of infancy and childhood in which to learn.[1]

Vision is much more than an ability to see clearly near and at a distance. It is the ability to look at marks on a paper that stand for a thing and know what that object feels like, sounds like, tastes like, smells like or looks like without actually feeling, listening to, tasting, smelling or looking at the object. Visual perception is the process of attaching meaning to incoming stimulus or sensation. It is naming the letter "A," labeling an outline drawing of a square as a square, recognizing that a square and a circle are different shapes or decoding the word "dog" into speech sounds and associating these sounds with what they symbolize. (dog) When the activity of looking becomes integrated with the sensation of seeing, visual perception takes place.

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[1]Jean Itard, The Wild Boy of Aveyron cited in R. C. Orem, Montessori and the Special Child (New York: G. P. Putnam Sons, 1969), pp. 65-71.

The stages of development of visual perception begin early in the life of an infant, and develop sequentially through infancy, childhood and school years. The stages are the same for all children - be they so-called normal, special, gifted, exceptional or retarded. The time and rate of development is different in each child and can be different at each stage. The essential point is that there be learning or adequate skills at every developmental stage to insure adequate visual perception.

The newborn baby is visually sensitive to light from the moment of birth. Although a baby's eyes are closed much of the time, the eyeballs move laterally. Some scientists believe that the ability for gross segregation of the figure from the background is present at birth, but perception of form requires a fairly extensive period of learning.[2] In the early months, the infant's eyes become more mobile, he fixates on small objects one to three feet away and follows a dangling object. At six months he can perceive differences in brightness and soon learns to differentiate between his parents. He rapidly develops an ability to recognize various objects in the house. As the child grows, there is developmental patterning in his visual perception.

The criteria of a child's visual perceptual development

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[2] Tina E. Bangs, Language and Learning Disorders of the Pre-Academic Child (New York: Appleton-Century-Crafts, 1968), p. 31.

is varied, dependent upon sources of reference. Copying outline drawings of geometric forms, focusing attention on a central figure, the ability to see things as a whole or unity or being able to separate figures and background are some of the criteria set up for good visual perceptual development. For some children, this sequence develops normally, after hundreds of trials and errors (experiences) and maturation. But if the visual image in the child's brain does not match the visual stimulus, he is said to have a visual-perceptual disorder. The stimulus was not structured properly for this child.

Children with learning problems or disabilities often spend their days in a world which is upside down and nothing in it makes order or brings meaning. They cannot perceive the world in an organized way. Their problems may involve eye-hand coordination, spatial relationship, depth perception, discrimination of color, size, symbol or form and relation of figure to background. All of these perceptual deficits could interfere with readiness for reading. It is also logical to expect that mentally retarded subjects will display inferior performance in relation to their mentally normal peers. If perceptual and cognitive abilities do develop at approximately the same rate, the mentally retarded child would be as deficient in visual perception as he is intellectually retarded.

Increasing attention has been tendered to the visual perceptual development of young children. This attention has been focused on training procedures to improve visual perceptual ability and tests to screen development of the same. There is not a great amount of research available on the young preschool child. The writer endeavored to research the following topics: (as they pertain to the preschool child).

1. The development of visual perception in the very early years.
2. The effectiveness of a visual perceptual training program.
3. The relationship of visual perceptual skills to reading readiness and reading success.
4. The visual modality of learning.
5. Valid instruments for assessing visual perception.

CHAPTER II

REVIEW OF RECENT RESEARCH

Development of Visual Perception

According to Gesell,[1] the development of vision in the individual child is complex because it took countless ages of evolution in the race to bring vision to its present advanced state. Human visual perception ranks with speech in complexity and passes through comparable developmental phases. Moreover, seeing is not a separate, isolable function; it is profoundly integrated with the total action system of the child; his posture, his manual skills and coordination, his intelligence and even his personality make-up.

Vision has a prominent place in neonatal development. Visual behavior patterns are among the first and most complex to assume form and function. When the neonate fixates on an object of interest, his sporadic bodily activities tend to subside; he stops fretting; he assumes a postural set. He may open his mouth and tense his lips. There are changes in rate and depth of respiration. The fixational response, therefore, involves the entire action system to some degree. Early visual

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[1] A. Gesell, Frances L. Ilg, and Glenna Bullis, Vision: Its Development in Infant and Child (New York: Paul B. Hoeber, 1950), p.8.

experiences of the infant soon become vivid and consuming. An infant's visual experiences may be somewhat sporadic and variable but they are not disordered. Gesell[2] traces visual perceptual development in the following manner:

Four weeks:	Visual acts include staring, though vaguely, at surroundings. Infant gives active, sustained attention to an object brought within several inches of his eyes.
Eight weeks:	Eyes become more mobile. Child fixates on small objects at distances of one to three feet. Child can follow a dangling object in arc of 90 degrees. Eyes and head tend to move together.
Twelve weeks:	Likes to watch wavering light - as candle. May cry when light is turned off.
Twelve to sixteen weeks:	New awareness of own surroundings. Fixates on own hands or objects of interest on table.
Sixteen to twenty-eight weeks:	Shifts gaze more freely. Regards image in mirror. Should infant seize an object of interest, it goes avidly to his mouth and he tries to inspect it even while he mouths it. (eye - hand - mouth) When toy drops, he pursues it with his eyes.
Twenty-eight to forty weeks:	Localizes sights. Often discriminates strangers. Watches with new penetration the actions and movements of people around him. Eyes follow ball. Peers into people's faces and empty cups.
Forty to fifty-two weeks:	Gazes upward. Identifies places. Surveys person from "head to toe." Studies toys. Looks at and studies food. Likes to watch motion of cars, boats and animals.

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[2] Ibid., pp. 42-48.

Twelve months:	Visual perception and manipulation show progress. Perceives emotional expressions. Brings one object beside another.
Fifteen months:	Bends over and looks at objects. Holds objects close or at arms length. Enjoys following moving objects.
Twenty-one months:	Eyes assume a leading and more directive role. Stops and stares. A lot of intensive looking. Explores electric plug, windows, doors, curtains.
Two years:	Identifies pictures. Watches what he does. Can look and then act. Increased visual discrimination of small objects. Looks for missing toys.
Two and a half years:	Sense of places and order. There is a trend toward more advanced teaming of the two eyes.

FitsGerald,[3] in relating the development of perceptual skills to readiness, states that the perceptual process begins with gross motor awareness. The random movements of a child in the early stages of development are not consciously controlled. As the child grows, control develops. At an early age, perception takes the form of comparing and relating the objects of which a child is made aware through the increased activity of his sensory organs. Coordinating the eye and hand, sensing the right side from the left side, extending this knowledge of laterality to determine a set direction, distinguishing figure and ground in objects viewed and placing observations in appropriate space are the

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[3] Agnes D. FitzGerald, "Perception Skills and Beginning Reading," <u>Elementary English</u>, XL (April, 1963), pp. 415-19.

primary demonstrations of a child's capacity to control himself with basic perceptual skills.

The Gestalt psychologists have given to us our present understanding that we tend to perceive in wholes. In the global form of perception skill, a child responds to a group of sounds rather than to actual sounds that make up a pattern. In the global stage of perception, the toddler calls all men "daddy" and all four-legged animals "dog."

At a later stage, children differentiate details in visual and auditory perception. In doing so, however, sometimes they loose the form as a whole and are left with nothing but a mass of details. In visual perception, difficulty occurs when certain details are used as clues. Kephart[4] describes the word "toot" which has elements that stick up at the front and back of the word. It is not necessary for the child to see the word as a whole but he recognizes these characteristics and gets the desired result. He further states that this type of child deceives the teacher at first by not showing any difficulty with sight words. With word analysis method and sounding out phonic elements, it is difficult for the child who still only sees global mass. He cannot break into parts if he sees no parts to begin with.

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[4] Dr. Newell Kephart, The Slow Learner in the Classroom (Columbus: Charles E. Merrill Books, Inc., 1960), p. 83.

Some children see a word as we first may see an incomplete figure. As a child attends to one part of a word, he may loose the other parts. He fails to see the "form." Vernon,[5] in summarizing the results of studies of visual perception says, "Some children are less likely to see words as wholes than as meaningless jumbles of details with no apparent relationship between these. These are the ones who will notice tiny flaws of the printer or the speck in the paper. The better reader scarcely sees them."

Space is a necessary part of perception. Without form and space, we cannot reproduce objects and sometimes we cannot even identify objects, such as square or the written word. Form and space are important for the same reason. Form establishes the relation within the figure and space establishes the relation between the figures.

At five years of age the normal child can make a square. To copy a square, a child must locate a beginning point - which he does with reference to his own body. He must get his hand to the exact starting point and distinguish one direction from another. The idea of laterality leads to the idea of direction. If a child has not established which is right and which is left, certain relationships of space will be meaningless. Some lines and circles that make up printed letters are the same except for

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[5] M. D. Vernon, Backwardness in Reading (Cambridge University Press, 1957), p. 15.

position. Without laterality there is no difference between the letter "b" and "d." As Kephart[6] notes, it is not that the child hasn't learned the difference or not that he reverses, but to him no difference exists.

In order to obtain a relationship between elements, a child must establish a system of fixed direction. If one is to distinguish any difference between "left" and "felt" one must have a consistent way of seeing these in a fixed direction of left to right.

Senden[7] in discussing space and form relationship, tells of a blind person, given sight by surgery, was taught to distinguish a □ and △. After thirteen days, he could not report which form was which without counting corners. Thus details were first perceived as elements in themselves. After he counted corners, the total pattern or grouping of elements emerged. This is related to the developmental process in reading, when the beginning reader is prone to identify words with certain compelling and dominant letters. The pattern materializes only through practice.

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[6] Dr. Newell Kephart, The Slow Learner in the Classroom (Columbus: Charles E. Merrill Books, Inc., 1960), p. 32.

[7] M. Senden, Raum-und Gestaltauffassung bei operierten Blindgeborenen vor und nach der Operation as cited in Dr. Newell Kephart, Slow Learner in the Classroom (Columbus: Charles E. Merrill Books, Inc., 1960), p. 77.

Fantz[8] demonstrated the existence of form perception in very young infants. He believed that long before an infant can explore his surroundings with his hands and feet, he is busy exploring it with his eyes. Fantz, using thirty infants, one week to fifteen weeks of age, tested at weekly intervals with four pairs of test patterns submitted in random sequence. Presented in decreasing order of simplicity, the patterns included (1) horizontal stripes and a bull's eye design, (2) a checkerboard and two sizes of plain squares, (3) a cross and a circle and (4) two identical triangles. The total time looking at various pairs differed sharply, with the more complex pairs drawing the greater attention. Neither cross and circle nor two triangles aroused significant differential interest. The differential response to pattern was shown at all ages tested - indicating that it was not the reslut of a learning process. Direction of preference between stripes and bull's eye, on the other hand, changed at two months of age - due to either their learning or their maturation. Clearly some degree of form perception is innate.

Fantz[9] also went further in his study of perception in

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[8] R. R. Fantz, "The Origin of Form Perception," Scientific American, CCIV (May, 1961), pp. 66-72.

[9] Ibid., pp. 66-72.

infants and set out to measure change in visual acuity. He presented the infants in the looking chamber with a series of patterns composed of black and white stripes - each paired with a grey square of equal brightness. The width of the stripes was decreased in graded steps from one pattern to the next. Since Fantz already knew that infants tended to look longer and more frequently at a patterned object than at a plain one, the width of the stripes of the finest pattern that was preferred to grey would provide an index to visual acuity. The width of the finest stripes that could be distinguished turned out to decrease steadily with increasing age during the first half year of life. By six months of age, babies could see stripes 1/64 inch wide at a distance of ten inches. The conclusion is that the effects of maturation on visual acuity are relatively clear. The author also stated that deprivation of visual stimuli would impair later visual performance, citing the example of a previous experiment, where chickens, kept in complete darkness for several weeks, lost their ability to peck at food. If form perception were wholly innate, it would be evident at any age and visual deprivation would have no effect. Infants perceive and respond to form, without experience, if given the opportunity at the appropriate stage of development.

Koopman,[10] showing schematic faces and scrambled faces to

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[10] P. R. Koopman and E. W. Ames, "Infants Preference for Facial Arrangements: A Failure to Replicate," Child Development, XXXIX (June, 1968), pp. 481-7.

infants, declared that at present there is no conclusive evidence that infants consistently show any differential amounts of fixation to the schematic face vs. the scrambled face.

In addition to reviewing research on the development of visual perception from infancy, some research must be presented on development of visual-motor skills beginning with earliest spontaneous drawings.

Bender[11] considered the first drawings of children to be meaningless scribbles that are the result of motor play. She noted that these meaningless scribbles are usually performed by large arm movements in a clockwise whirl if the child uses his right hand or in a counter clockwise whirl if the left hand is used.

Gesell[12] states that a child's spontaneous drawing may be traced back to chance marks made by an infant. He reported that a one year old child may accidentally mark a paper by hitting a crayone against it, but by fifteen months, he deliberately marks the paper. At eighteen months spontaneous scribbling is noted.

Ilg and Ames[13] described the child's response to paper and

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[11] Lauretta A. Bender, A Visual Motor Gestalt Test and Its Clinical Use cited in Dr. Mary H. Bosworth, Improvement of Visual-Motor Skills (Winter Haven: Winter Haven Lions Research Foundation, Inc., 1967), p. 4.

[12] A. Gesell, Frances L. Ilg and Glenna Bullis, Vision: Its Development in Infant and Child (New York: Paul B. Hoeber, 1950), p. 56.

[13] Frances L. Ilg and Louise B. Ames, School Readiness, Behavior Tests Used at the Gesell Institute (New York: Harper and Row, 1965), pp. 4-10.

crayon. A seven-month-old infant is intrigued by the paper which he crumples, tears or brings to his mouth. A slightly older infant picks up crayon, chews on it and bangs on it and breaks it. At about twelve months of age, the child bangs the crayon against the paper and seems aware of the marks he makes. Based on these investigators' reports it would seem that there is a gradual differentiation in the development of scribbling.

Visual Perceptual Training

Increasing attention has been given to the study of the effects of visual perception training for young children both "normal" and "special."

R. M. Allen, Dickman, Allen and Haupt[14] conducted a pilot study to determine if educable retardates can improve certain visual perceptual skills with a specialized intensive training program. (Frostig - Horne, "Developing Visual Perception.") The Frostig Developmental Test of Visual Perception was administered to the educable residents of Hope School for the Mentally Retarded. Two groups were selected randomly, an Experimental Group of ten subjects to receive training for one semester using the Frostig materials and a Control Group of six subjects taking part in the usual daily school routine. Both groups were retested and the results indicated that special training can

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[14] Robert M. Allen, *et al.*, "Visual Perceptual Abilities and Intelligence in Mental Retardates," *Journal of Clinical Psychology*, XXI (July, 1965), pp. 299-300.

improve the mental retardate's skill in making figure-ground- relationships, appreciating figure constancy and dealing with spatial relations. In general, special training has yielded immediate discernible improvement in three of the five testable visual perceptual skills in the Developmental Test of Visual Perception. Further research could be justified, because of the small number of subjects and the unmatched pairs.

Dr. Mary Bosworth[15] experimented with kindergarten children to evaluate the use of an arbitrarily determined sequence of learning activities to improve visual motor skills. Specifically: (1) How much can the ability to copy selected geometric figures be improved by training? (2) Does this training improve the ability to discriminate words? The subjects, from one private school and one public school in Coral Gables, Florida, were given a Pre-test, the training and a Post-test. Her results showed that kindergarten pupils' ability to reproduce selected geometric figures is amenable to training and that word discrimination ability is in turn improved by training in reporductions of selected geometric figures.

Frostig and Horne[16] hypothesized that the Frostig program

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[15] Dr. Mary Bosworth, Pre-Reading: Improvement of Visual Motor Skills (Winter Haven: Winter Haven Lions Research Foundation, Inc., 1967), pp. 1-48.

[16] Marianne Frostig and D. Horne, The Frostig Program for the Development of Visual Perception (Chicago: Follett, 1964).

of perceptual training would be an effective method to aid culturally deprived children. The subjects were 108 kindergarten children of unselected mental ability from an urban Iowa Elementary School in one of the Office of Economic Opportunity Target Areas. The training program (twenty-five minutes each day) included both the sensorimotor and visual-perceptual exercises described in Frostig-Horne Teacher's Guide. (1964)

When comparing the two groups after eight months of training, significant differences in mean scores were found in favor of the experimental group. Findings support the author's hypothesis that the program is of benefit for culturally deprived kindergarten children - with a reservation that future studies should set up better statistical controls.

Another study concerned with the socio-economic variable was undertaken by Gill.[17] It was his hypothesis that significant differences in perceptual abilities exist between groups as to socio-economic experience, special instruction and sex. The subjects, 184 children from a University Laboratory School and two public elementary schools, consisted of children from nursery, kindergarten and first grade.

One half of the nursery group was given special body orientation instruction. The remaining children from the public

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[17] N. T. Gill, et al., "Selected Perceptual and Socio-Economic Variables, Body-Orientation Instruction and Predicted Academic Success in Young Children," Childhood Education, XLV (September, 1968), pp. 52-4.

schools were considered to be socio-economically disadvantaged. Approximately one half of the disadvantaged were Negroes. Results indicated that socio-economically advantaged children perform more effectively on selected perceptual tasks, that racial heritage is not a significant factor in determining a child's perceptual ability, that selected body orientation exercises significantly enhance particular perceptual abilities in young children, and finally that sex differences noted in the relationships between particular perceptual variables and academic performance were more apparent than differences between perceptual abilities by sex.

Based upon the theory that improvement of visual perceptual performance should be reflected in improved performance on sensori-motor and concept formation tasks, Alley[18] investigated the effects of an extended systematic training program of visual-perceptual activities with mentally retarded children. Forty-eight subjects were selected - educable mentally retarded with an age range of seven years, five months, to nine years, ten months, who were enrolled in special classes in in urban Iowa public school system. The experimental group was subjected to a systematic visual-perceptual training program covering a two-month period, while the control group spent the concurrent time in regular

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[18] Gordon R. Alley, "Perceptual-Motor Performances of Mentally Retarded Children After Systematic Visual Perceptual Training," American Journal of Mental Deficiency, LXXIII (September, 1968), pp. 247-50.

special education classrooms. The Frostig Horne materials were used for 39 minutes each day. Identical assessment instruments were used for both groups as pre-training and post-training measures of performance. No significant differences were evident between mean scores of two groups with respect to sensorimotor performance, visual perception, or concept formation. Alley found no advantage derived by educable mental retardates from a systematic visual perception program. He did feel that the length and the limiting conditions of the training program might have had an effect on the results.

With a view to improving instructional material, Travers,[19] experimented to find how and to what extent children benefit from pictorial illustrations. He conducted a "Study of the Advantages and Disadvantages of Using Simplified Visual Presentation in Instructional Materials." Using children from nursery schools and kindergarten to sixth grade, he presented pictures by means of a tachistoscope. This led to a conclusion that a picture becomes more recognizable as more clues are furnished. He taught the concept of one-half by means of abstract materials and these children did as well as those taught with illustration of real objects. The best learning was achieved when children were taught and tested with realistic materials. Perception increased with age. Travers felt a great deal more research should be done to investigate this hypothesis further.

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[19] R. M. W. Travers and V. Alvarado, "Design of Pictures for Teaching Children in Elementary School," AV Communication Review XVIII (Spring, 1970), pp. 47-64.

Predictor of Reading Readiness and Reading Success

The quest for a predictor of reading readiness and reading achievement has a history spanning many decades. Research yields significant insights regarding the "meaning" of visual perceptual skills and methods to be used as indicators of perceptual readiness for reading. Research also can be used as a basis for preventing certain types of reading difficulties. Studies may lend further information with respect to perceptual deficits of the retarded reader or non-reader.

Research in this field has been successful only to a limited degree because: the studies in this category are exploratory in nature, they are vague in their theoretical framework, the predictive tests and measures of reading achievement are not comparable, sampling method and method of reporting data is not standardized. Some examples are Gates[20] who used discrimination tasks and concluded that (1) the ability termed "word perception" is most closely related to achievement in reading and spelling, (2) intelligence yields the next highest correlation, and (3) tests of perception of geometric figures show but a slight association with these abilities. However, these conclusions appeared to derive from a test bias - the task complexity was not equivalent.

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[20] A. I. Gates, "A Study of the Role of Visual Perception, Intelligence and Certain Associative Processes in Reading and Spelling," Journal of Educational Psychology, XVII (April, 1926), pp. 443-45.

Deputy[21] probably conducted the first major study of reading readiness. He developed a formula for predicting reading achievement from tests of mental ability, visual-visual association, word selection, auditory-visual association, content comprehension and recall.

In an investigation of visual perceptual readiness for beginning reading, Petty[22] obtained a correlation of 48 between a drawing test and reading ability - except that the outside criterion of reading ability was the teacher's grades.

Goins[23] administered an experimental series of fourteen perceptual tests, designed by Dr. Thelma Thurstone, to 120 first grade pupils at the University of Chicago Laboratory School. Although she found a wide range of individual performance, the scores on Pattern Copying, Reversals, and combined perceptual scores correlated most highly with reading achievement.

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[21] E. C. Deputy, "Predicting First Grade Reading Achievement" as cited in Dr. Katherine Di Meo, Response Characteristics and Pre-Reading Behavior (Winter Haven: Winter Haven Lions Foundation, Inc., (1967), p. 25.

[22] M. C. Petty, "An Experimental Study of Certain Factors Influencing Reading Readiness," Journal of Educational Psychology XXX (February, 1939), p. 215.

[23] Jean T. Goins, "Visual Perceptual Abilities and Early Reading Progress," Supplementary Educational Monographs, No. 87 (Chicago: University of Chicago Press, 1958).

Robinson[24] at the 1957 IRA Conference said, "The most significant visual conditions for reading are: eye coordination of difficulties involving depth perception, visual fusion and lateral and vertical eye muscle balance." Robinson also believed a child should have a feeling for space so as to have an awareness of objects behind him or around him.

Another early investigator, Teagarden,[25] found that six to seven year old children, prior to any formal instruction in learning to read, generally used some regular order when naming pictures arranged in five rows and five columns. No significant difference was found on the naming test between subjects with or without previous kindergarten experience. This suggests that prior to specific learning or left to right response, a more general perceptual organization is independently achieved.

A study by Rudnick, Sterrett and Flax,[26] found that visual perceptual abilities decline in importance from third grade on,

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[24] Helen M. Robinson, Clinical Studies in Reading, No. 77 (Chicago: University of Chicago Press, 1957), p. 120.

[25] Lorene Teagarden, "Tests for the Tendency to Reversals in Reading," Journal of Educational Research XXVII (October, 1933), pp. 81-97.

[26] M. Rudnick, et al., "Auditory and Visual Rhythm Perception and Reading Ability," Child Development XXXVIII (June, 1967), pp. 581-7.

while general intelligence and auditory perception becomes more important to individual differences in reading ability. Third grade boys with a mean age of eight years, nine months, were given three perceptual tests, intelligence tests and reading comprehension tests.

The purpose of the investigation of Alley[27] was to show that the Frostig program would be an effective method for culturally deprived children in a reading readiness program. Using 108 kindergarten children, from an urban Iowa Elementary School in an Office of Economic Opportunity Target area of cultural deprivation, of unselected mental ability, both the sensorimotor and visual perceptual exercises, as described in Frostig Horne's teacher's guide, were used for 25 minutes each school day. After completing the training both the experimental and the control group were given the Marianne Frostig Developmental Test of Visual Perception (1964) and the Metropolitan Reading Readiness Test, Form A (1965).

Significant differences in the mean scores in favor of the experimental group were found when comparing the two groups on a reading readiness measure support the hypothesis that the Frostig program is of benefit in a reading readiness program for

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[27] Gordon Alley and Wm. Snider, "Reading Readiness and the Frostig Training Program," Exceptional Children XXXV (September, 1968), p. 68.

culturally deprived kindergarten children - with the reservation that the total teaching presentation - personality, interests and classroom management were not controlled.

Visual discrimination appears to have a great acceptance as an index of reading readiness and as a predictor of success in learning to read. Gates[28] made the first investigation of importance that was concerned with visual discrimination. He concluded that ability to detect small differences in words shows a fairly high correlation with reading, whereas ability to see differences in pairs of objects had no association with reading. Sister Mary of Visitation[29] in a similar study verified many of his conclusions - the ability to discriminate minute details in series of actual words and also in groups of unrelated letters are pre-eminent factors in reading.

Shea[30] constructed a test of visual discrimination of words - made of two sections (words and letters). Her investigation was to determine which of the following: The Metropolitan Reading

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[28] A. I. Gates, "A Study of the Role of Visual Perception, Intelligence and Certain Associative Process in Reading and Spelling," Journal of Educational Psychology XVII (May, 1926), pp. 443-45.

[29] Sister Mary of Visitation, (1929) cited in Carol Ann Shea, "Visual Discrimination of Words and Reading Readiness," Reading Teacher XXI (January, 1968), p. 362.

[30] Carol Ann Shea, "Visual Discrimination of Words and Reading Readiness," Reading Teacher XXI (January, 1968), pp. 361-7.

Readiness Test, Large Thorndyke Intelligence Test or the Test of Visual Discrimination of Words was the best predictor of reading and achievement at mid-year in first grade. For subjects she used 76 first graders, 34 boys and 42 girls. The results of the investigation were: (a) The ability to disciminate words visually was an indicator of readiness to begin formal reading instruction when sight method of instruction was used; (b) Combination of Large-Thorndyke and Visual Discrimination Test were better predictors of success in readiness to read; (c) Each child in the crucial lower quarters of the Visual Discrimination of Words Test should be given extensive training in visual perception before formal reading instruction.

Bonsall and Dornbusch[31] investigated the relationship between reading ability and the developmental stage of the child as a function of task difficulty, exposure duration and meaningfulness of visually presented materials. These variables were studied across three tasks which required the child to recognize similarities, differences or identities between pairs of simultaneously presented material. The subjects were 60 children from South Brunswick, New Jersey - 20 were from the second, fourth and sixth grades. Ten normal readers and ten retarded readers were selected from each grade. All subjects made the

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[31] C. Bonsall and R. L. Dornbusch, "Visual Perception and Reading Ability," Journal of Educational Psychology IX (August, 1969), pp. 294-9.

greatest number of errors on discrimination tasks. Performance was worse at the fastest exposure duration. The younger subjects did considerably worse than the older. The least difference in performance of young and older subjects was at the slowest exposure levels. The identity tasks were easiest. The authors suggest that in general, research findings defining the importance of visual discrimination abilities in reading have often been contradictory. The one clear cut point made is that reading materials for early stages should not emphasize speed.

Perception largely consists of visual perceptual learning which frequently involve manipulation of objects. To evaluate the possibility that a series of perceptual tasks should be significantly associated with an established language type test Scott[32] and others constructed a Perception Test which consisted of varied and sequential tasks - including size perception, ordering objects by size (smallest to largest) pattern perception, and matching dissimilar objects on basis of relative size. Results showed that Perception Test scores at kindergarten are good predictors of children's later reading success.

The test administered was given to 46 Negro and 41 Caucasian kindergarteners with results showing that regardless of race,

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[32] R. Scott, "Perceptual Skills, General Intellectual Ability, Race and Later Reading Achievement," Reading Teacher XXIII (April, 1970), pp. 660-8.

kindergarten children with an inadequate base of perceptual experiences are more likely to encounter reading difficulties. For these children, sequential perceptual learning should probably precede early reading.

To determine to what extent visual, motor and perceptual training would improve the reading and general achievement of children with visual, motor and perceptual deficiencies, Litchfield[33] selected 80 first, second and third graders having handicaps and randomly divided them into experimental and control groups. The experimental group was given one half hour's training with exercises and activities each day for six months. Activities and training included ocular motor movement skills, laterality and directionality, spatial judgment, eye-hand-coordination and visualization. Post-tests (Large Thorndyke, Gates McGintee Reading Test, and Stanford Achievement) were given. I.Q. and Achievement Test showed no gains of the experimental over the control group, but fine screening results showed more improvement in visual-motor perceptual functioning by the experimental group. Anecdotal records by classroom teachers reported progress by nearly all experimental students.

The Winter Haven Program of Visual Motor Training has been

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[33] D. Litchfield, "A Program of Visual Motor Perceptual Training to Determine Its' Effect Upon Primary Level Children with Reading and Learning Disabilities," U.S. Department of Health, Education and Welfare, 1970. (Microfeche)

successful with first graders. Keim[34] researched to determine the effects of a visual-motor training program on the readiness for learning and on measures of intelligence of kindergarten children. Three groups of children with no previous kindergarten experience were set up: 2 groups with children who had visual motor deficiencies (an experimental and a control group) and a group who evidenced no visual-motor difficulties. Only one group with visual-motor deficiencies received the Winter Haven Training Program exercises. Statistically significant differences among the three groups were found on only Matching and Copying subtests raw scores of the Metropolitan Readiness Tests. No significant differences between means of experimental and control groups in measured intelligence. Forty percent of the experimental group with initial visual-motor defficulties continued to have poor visual-motor skills. Teachers involved found template training procedures too rigid for many kindergarten children; time to conduct training was excessive and the teacher's manual needed revising.

The anticipated results were not achieved. A broad implication could be that there should be no visual training program in kindergarten; but this conclusion is hardly justified.

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[34] R. P. Keim, "Visual Motor Training, Readiness and Intelligence of Kindergarten Children," Journal of Learning Disabilities III (May, 1970), pp. 256-9.

Because of being resentful of professionals who make claims about visual perception tests predicting reading scores or abilities, Cohen[35] initiated a research project with first graders. The Frostig test was administered to first graders in eight elementary schools in New York. A total of 120 were randomly selected and perceptual training followed. No significant changes in reading achievement were noted - no real gain. Jacobs[36] also found no real gain in using the Frostig Training Program. As Cohen says, "The perception factors may be more relevant to I.Q., but this does not automatically lead to reading achievement scores."

Hartung[37] investigated to evaluate visual perception skills of beginning readers. In more detail he compared the visual perception skills of young deaf and hearing children. He correlated these findings with reading achievement and attempted to determine whether or not the deaf child is as effective a user of phonologic code as the hearing child. Thirty orally trained deaf children and thirty normally hearing children were matched

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[35] S. A. Cohen, "Studies in Visual Perception and Reading in Disadvantaged Children," Journal of Learning Disabilities, II (October, 1969), pp. 498-503.

[36] J. N. Jacobs, "Follow-Up Evaluation of the Frostig Visual-Perceptual Training Program," Educational Leadership XXVI (November, 1968), pp. 169-75.

[37] J. E. Hartung, "Visual Perception Skill, Reading Ability and the Young Deaf Child," Exceptional Children IIIVI (April, 1970), pp. 603-8.

in C.A. - seven years five months to nine years. All had normal intelligence or above. Results indicated that many of the deaf children were not inferior on visual perceptual skills tested but had less knowledge or facility with alphabetic code. The deaf and hearing groups had similar percent scores on identification of Greek symbols in Greek trigrams - thus no difference in visual perceptual skill itself. Performance of the two subject groups was the same on recognition tasks but normally hearing children performed better on recall. Both groups showed better performance for pronounceable items.

No serious student of the reading process can escape the fact that reading is a very complex, perceptual, cognitive and affective task. T. C. Barnett[38] states, "Reading involves the visual perception of written symbols and the transformation of the symbols to their explicit or implicit oral counterparts."

In Krippner's "Evaluating Pre-Readiness Approaches to Reading," Dr. Kephart[39] suggests approaches for remediation of reading. He suggests that we involve the teaching of such pre-readiness skills as eye-hand coordination. Even eye-hand coordination in some instances must be preceded by the attainment

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[38] T. C. Barnett, "The Evaluation of Children's Reading Achievement," (Newark, Del.: International Reading Association, 1967) p. 15.

[39] Dr. Newell Kephart, The Slow Learner in the Classroom, as cited in: Stanley Krippner, "Evaluating Pre-Readiness Approaches to Reading," Education LXXXVII (September, 1966), pp. 16-18.

of lateral dominance, directional knowledge, smooth eye movements, manual dexterity, and ability to halt an action at will. Ideally this should be mastered at home, but some children reach school without having mastered the pre-readiness skills. Holgren[40] also states that pupils with poor visual skills should follow Kephart's suggestions. Getman[41] advocates six basic developmental processes:

1. general movement
2. specific movement (manipulative)
3. eye movement
4. communication
5. visualization
6. visual perceptual organization

Getman's investigation of 213 pupils in North Carolina demonstrated beyond reasonable doubt that visual screening test scores are closely related to reading abilities and are related to a lesser but still important degree to school grades. Marianne Frostig[42] states, "Research demonstrates that the status of visual

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[40] M. R. Holgren, "Opus in See Sharp," Education LXXXI (February, 1961), pp. 369-71.

[41] G. Getman, How To Develop Your Child's Intelligence Luverne, Minn.: Author, 1962.

[42] Marianne Frostig (p.17) cited in Stanley Krippner, "Evaluating Pre-Readiness Approaches to Reading," Education LXXXVII (September, 1966), pp. 16-18.

perception development is a sensitive indicator of the developmental status of the child as a whole. In addition there is a significant correlation between visual perceptual ability and reading achievement especially in lower grades."

Criticism of visual training and the emphasis which some educators and psychologists place on visual perception difficulties has come from many prominent psychologists, psychiatrists and opthamologists. Hardesty[43] denies that there is any study in literature which definitely established the fact that there was a correlation between faulty eye coordination and reading difficulties. Rabinovitch[44] concedes that physiological factors as well as psychological factors may produce reading problems, but feels that creeping and crawling activities are regressive and may bring about emotional disturbances. Blackhurst[45] asserts that an optometrist who offers visual training either does not understand the problem or is trying to pad his office practice because most poor readers have psychological problems.

The growth of the pre-school child is not to be left to

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[43] H. H. Hardesty, "Eye Exercises" cited in Stanley Krippner, "Evaluating Pre-Readiness Approaches to Reading," Education LXXXVII (September, 1966), pp. 16-18.

[44] R. Rabinovitch, "Neuropsychiatric Factors" cited in Stanley Krippner, "Evaluating Pre-Readiness Approaches to Reading," Education LXXXVII (September, 1966), pp. 16-18.

[45] R. T. Blackhurst, cited in Lawrence Gould, "An Optometrist Looks at Perception," U. S. Department of Health, Education and Welfare: Office of Education, May, 1969.

chance. A structured program should be offered - a fact that is missing from most of research. All investigations are done with a training program designed for a group - no individualized instruction. More research must be done - based on prescriptive teaching, before the importance of pre-readiness factors can be clearly determined and more appropriate methods of insuring proper development are adapted. Choice of methods to study or to teach beginning reading should take into account each child's specific strengths and weaknesses. Choose the optimum method to help a particular child learn to do a particular task.

Visual Modality of Learning

Some of the recent research identifies potent factors in perceptual learning, evaluates relationships between different modalities of learning and compares and contrasts significant theoretical constructs. Many studies have delved into the perceptual deficits of the learning disabled and retarded.

Within the general area of the manner in which a child receives a stimulus perceptually and responds to it, Norcross and Spiker[46] found that possession of names for the stimuli in a learning task enhances performance on the task. Seventy pre-school children, ages 3 years, six months to 5 years, six

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[46] Kathryn J. Norcross and Charles E. Spiker, "Effects of Type of Stimulus Pre-Training or Discrimination Performance in Pre-School Children," Child Development XXVIII (January, 1957), pp. 79-84.

months, were divided into three groups - all randomly assigned.

Norcross and Spiker compared the performance of the three groups in a simple discrimination learning situation involving a pair of highly similar but discriminative pictures. The groups differed in pre-training experience.

A. Group R attached discrete names to the pictures used in a transfer discrimination task.

B. Group D learned to respond verbally with "same" or "different" when presented with these same stimuli.

C. Group I had learned names for different control pictures.

They (Spicker and Norcross) agreed that possession of verbal labels for the stimuli in a learning task produces superior performance on that task.

Another study in perceptual development was done by Elkind, Koegler, and Go[47] who tested 195 children for their ability to perceive both parts and wholes. Two distinct age groups were used: (1) Nursery school and first three grade levels of one elementary school and (2) first four grades of another elementary school. All were individually tested, with results showing a regular increase with age in ability to perceive parts and wholes; parts were perceived at an earlier age than wholes, and part and whole integration was present in a majority (75%) by age nine.

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[47] David Elkind, Ronald Koegler, and Elsie E. Go, "Studies in Perceptual Development," Child Development XXXV (May, 1964), pp. 81-90.

Researching spatial organization, Gottschalk[48] examined the development of systematic response tendencies in pre-school children. Sixty-three boys and girls (C.A.: 3-3 to 6-3) named all objects on two forms of a pictorial display. There were 20 familiar objects, arranged in four rows and five columns, which the children were to name. They were retested two weeks later. Improvement in response was noted. There was a gradual change in perception from a disorganized hit or miss process of naming to a more stable one. Improvement in correct response was noted, due to past experience. In the retesting, more left to right sequencing was noted with the girls showing the greatest amount.

Another perceptual study by Elkind[49] investigated responses to ambiguous pictures. Using 171 children, six to eleven years of age, from a lower middle class area, Elkind found a low, but positive correlation between scores obtained on ambiguous pictures and those obtained on a widely used group test of general intelligence, that the ability to perceive hidden figures in ambiguous pictures improves with age, and with the exception of sixth grade, mean ambiguous picture scores tend to increase regularly with age.

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[48] Judith Gottschalk and M. P. Bryden, "Spatial Organization of Children's Responses to a Pictorial Display," Child Development XXXV (1964), pp. 811-815.

[49] David Elkind, "Ambiguous Pictures for Study of Perceptual Development and Learning," Child Development XXXV (December, 1964), pp. 1391-6.

Pursuing the perceptual development, Elkind and Weiss[50] investigated to determine the manner in which children at different age levels explore pictorial arrays which vary to the extent to which they manifest strong Gestalt qualities such as continuity and closure. Eighty-five children, five, six, seven and eight years old, roughly comparative in ability and socio-economically were selected as subjects. Results were:

1. Exploration of an unstructured stimulus array became more systematic and increased with increasing age.

2. Exploration of a structured array was systematic at all age levels tested, although the pattern of exploration varied at successive age levels.

Some interesting notes from this research found older children employing more complex patterns than younger children when exploring an unstructured stimulus array. Kindergarteners explored according to the properties of the configuration (Δ). First graders read figures in the triangle from left to right, showing they had acquired a pattern of exploration.

To study the correlation between communication accuracy scores for colors and the accuracy with which colors are remembered Dale[51] selected 24 subjects of ages, three years nine

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[50] David Elkind and J. Weiss, "Studies in Perceptual Development: Perceptual Exploration," Child Development XXXVIII (June, 1967), pp. 553-61.

[51] P. S. Dale, "Color Naming, Matching, and Recognition by Pre-Schoolers," Child Development XL (December, 1969), pp. 1135-44.

months to five years one month. Matching and naming colors made up the first session, with recognition tested the second session. A definite relationship appeared between the name given to a color and the manner the color was manipulated by the child in matching and recognition tasks.

In support of the belief that pre-schoolers are able to discriminate and have developed a shape perception Ghent[52] showed children between the ages of four and eight a large variety of meaningless forms in pairs, with one member in each pair being an upside down rotation of the other. She found that even the youngest children displayed marked preference when asked to designate the figure in each pair which they felt looked "upside down" or "wrong."

Wohwill and Weiner[53] found that children as young as four to five years old have little difficulty on the average in discriminating stimuli on the basis of their spatial orientation - provided the task requires a response to this cue - upside down or reversal. Twenty-four children were given a set of matching form samples which required them to differentiate an outline figure from its upside down or left-right reversal. Children showed a high level of proficiency in this task - indicating a

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[52] L. Ghent, "Form and Orientation," American Journal of Psychology LXXIV (January, 1961), pp. 177-90.

[53] J. F. Wohwill and M. Weiner, "Discrimination of Form Orientation in Young Children," Child Development XXXV (November, 1964), pp. 1113-25.

well-developed ability to respond to stimulus orientation as a differentiating cue. Children had a high degree of success in differentiating stimuli on the basis of their orientation.

In another investigation of discrimination, Hall[54] found that older subjects were better able than the younger ones to discriminate between words that had been presented to them and those that had occurred only as an implicit associative response.

The test consisted of obtaining associative responses of children to a set of stimulus words, then requiring the children to differentiate among three types of words: (1) words previously presented to them, (2) their responses to presented words, (3) set of new words. First and fourth graders were used as subjects. Discrimination errors were more frequent for the younger children.

Vision affects the performance and achievement of every child. This is particularly true in the area of special education. Arbital[55] writes concerning the Grossmont Vision Program. The purposes of the program are:

1. To detect those children who have vision or potential vision problems that may affect the physiological or perceptive process of vision.

2. To identify those children who have vision problems that interfere with school performance.

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[54] J. W. Hall, "Errors in Word Recognition and Discrimination by Children of Two Age Levels," Journal of Educational Psychology LX (April, 1969), pp. 144-7.

[55] I. Arbital, "Grossmont Vision Programs," Exceptional Children XXXIV (Summer, 1968), pp. 759-60.

3. To give school counselors information that may be an aid in counseling children as to the possible effect of vision problems and their relationship to future career opportunities.

As part of the Grossmont Vision Program, the following tests are given:

1. Visual acuity - at 20 ft. and 16. in.

2. Cover test - objective determination of eye muscle coordination for distance and near. 2- ft. and 6 in.

3. Skiametry - objective determination of refractive error.

4. Quality of vision.

5. Color vision test - 5 or more plates.

6. Organic problems - internal and external.

Each child is given this screening of his vision and the report is given to the teacher. From this point, she can analyze the perceptual-visual-motor needs and prescribe activities to help him learn.

In an early study of visual perceptual skills and the mental retardate, Mc Murray[56] compared an exogenous group with an endogenous group of mental retardates. The subjects were paried on the basis of sex, C.A., and intelligence. Exogenous mental retardates exhibited unusual perception as revealed by their tendency to perceive fewer reversals in moving figures projected on the screen.

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[56] J. G. Mc Murray, "Visual Perception in Exogenous and Endogenous Mentally Retarded Children," <u>American Journal of Mental Deficiency</u> LVIII (1954), pp. 659-63.

Halpin[57] found that brain-damaged children made more errors on tasks requiring visual motor integration than did matched familial retarded children.

An issue particularly important to the education of the mentally retarded is the contribution of perceptual skills to his intellectual functioning. Allen, Haupt and Jones[58] compared scores on the Frostig Developmental Test of Visual Perception with WISC results. Factor analytic studies have found consistently that perceptual skills separate out as distinctly different from a general intellectual factor. Sixty-five educable retardates from a special class were given the above mentioned tests. From the results, it is concluded that perceptual skills contribute importantly to intellectual functioning in mental retardation. This study strongly suggests the need to understand more fully the contributions of perceptual efficiency to measures of intellectual functioning.

Mira's[59] study reports individual patterns of looking and listening preferences of a group of children with learning

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[57] Virginia G. Halpin, "Rotation Errors Made by Brain-Injured and Familial Children on Two Visual-Motor Tests," American Journal of Mental Deficiency LIX (1955), pp. 485-89.

[58] Robert M. Allen, T. D. Haupt, and R. W. Jones, "Visual Perceptual Abilities and Intelligence in Mental Retardates," Journal of Clinical Psychology XXI (July, 1965), pp. 299-300.

[59] M. P. Mira, "Individual Patterns of Looking and Listening Preference Among Learning Disabled and Normal Children," Exceptional Children XXXIV (May, 1968), pp. 649-58.

disabilities and a group of normal children. Subjects, five years eleven months to eleven years four months were in two groups - one being a learning disabilities group. All were free of auditory and visual handicaps.

Each child's total performance was analyzed individually in terms of patterns of working and abstaining to look and to listen. Children demonstrate individual patterns of attention to auditory and visual events. This indicates that instructional material could be more effective if programmed according to a child's pattern of modality preference. The result of this research suggests that listening defects are more common than looking defects.

The primary purpose of the research of Bradley[60] was to illustrate the necessity for differentiation of teaching materials and analysis of the task to be learned in order to relate them to the individual learning handicaps of the child. She investigated the differential responses of mentally retarded children to three-dimensional and two-dimensional visual tasks. Also, whether those who have severe problems in completing visual-motor activities have more difficulty in responding to three-dimensional objects than those who have minimal problems. The subjects were 30 mentally retarded children from the Columbus State Institute

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[60] Betty Bradley, "Differential Responses in Perceptual Ability Among Mentally Retarded and Brain-Injured Children," <u>The Journal of Educational Research</u> LVII (April, 1964), pp. 421-3.

from Columbus, Ohio. (C.A. - nine years, three months to twenty-two years, six months and M.A. two years, nine months to six years, four months) I.Q.'s ranged from 17 to 59. Results of this investigation were that the severe visually impaired mentally handicapped group performed at a lower level than did the minimally handicapped group with three-dimensional objects. Familiar pictures and objects were identified more readily by both groups than were more uncommon visual stimuli. Both groups performed much better with familiar objects and pictures. A teacher may be preventing learning by not stimulating a child- by not stimulating with more unfamiliar types of stimuli. Often curriculum becomes sluggish due to unnecessary repetition and boredom imposed by the teacher rather than because of the learning handicaps of the children in the class. Specific analysis of learning characteristics of the mentally retarded as well as knowledge of the task to be learned, can provide new educational approaches to special education.

In a pilot study of diagnosis and remediation of special learning disabilities in pre-school children, Shipe and Miezitis[61] set forth to determine the feasibility of early identification of the perceptually handicapped and to compare effectiveness of two remedial programs: (1) language and cognitive development

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[61] D. Shipe and S. Miezitis, "Pilot Study in the Diagnosis and Remediation of Special Learning Disabilities in Pre-School Children," Journal of Learning Disabilities II (November, 1969), pp. 579-92.

and (2) visual motor functioning. Eight children with C.A.'s of four to six years and I.Q.'s greater than seventy constituted the population. After training in both areas the children were re-tested. It was concluded that efforts should be directed toward early identification of potential cases of specific learning disabilities. Strong advocates of this position have gone so far as to suggest compulsory perceptual and motor exercise for all kindergarten children.

It is considered unwise to wait until the child has demonstrated his disabilities in the form of severe academic retardation - it is then too late to begin remedial work. By that time the initial learning problem may have become complicated by serious secondary psychological effects resulting from frustration and failure in the learning situation.

Balmuth[62] investigated the visual and auditory modalities of learning- - which is important? How important is the visual or auditory modality of learning? Munsterberg[63] studied five adults with a series of numbers and colors to be arranged in order presented. Conclusion was based on percentage of errors. Visual memory excells strongly over aural when they act independently.

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[62] Miriam Balmuth, "Visual and Auditory Modalities: How Important Are They?" Presented to the 13th Annual I.R.A. Convention, April, 1968. U. S. Department of Health, Education and Welfare.

[63] Munsterberg (1894) as cited Balmuth, "Visual and Auditory Modalities: How Important Are They?" Presented to the 13th Annual I.R.A. Convention, April, 1968. U.S. Department of Health, Education and Welfare.

Other investigators also found visual mode more effective over aural. Hawkins,[64] names of objects: Calkins,[65] words and pictures: Beck,[66] audio and visual aids: Krewles,[67] visual mode of presentation is especially adopted for learning of difficult verbal material.

On the whole, examination of comparison of single modalities among children indicates that the evidence leans somewhat in the direction of the greater effectiveness of visual modality, although consensus has by no means been reached.

The purpose of Shepherd's[68] research was to investigate the existence of visual-motor-perceptual deficits among second grade

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[64] Hawkins, (1897) as cited Balmuth, "Visual and Auditory Modalities: How Important Are They?" Presented to the 13th Annual I.R.A. Convention, April, 1968. U.S. Department of Health, Education and Welfare.

[65] Calkins, (1898) as cited Balmuth, "Visual and Auditory Modalities: How Important Are They?" Presented to the 13th Annual I.R.A. Convention, April, 1968. U.S. Department of Health, Education and Welfare.

[66] Beck, (1962) as cited Balmuth, "Visual and Auditory Modalities: How Important Are They?" Presented to the 13th Annual I.R.A. Convention, April, 1968. U.S. Department of Health, Education and Welfare.

[67] Krewles, (1946) as cited Balmuth, "Visual and Auditory Modalities: How Important Are They?" Presented to the 13th Annual I.R.A. Convention, April, 1968. U.S. Department of Health, Education and Welfare.

[68] Clyde W. Shepherd, Jr., "Childhood Chronic Illness and Visual Motor Perceptual Development," Exceptional Children XXXVI (September, 1968), pp. 39-42.

children having a history of chronic illness and to investigate the relationship of selected components and concomitants of their chronic illnesses to the development of visual-motor-perception and to reading achievement. The subjects were 47 second graders, each of whom had been confined to a sickbed for a period of at least three consecutive months, between one and six years of age. The results: Children having a history of chronic illness, although of apparently normal intelligence performed consistently below expected levels for their chronological ages on visual-motor tasks. They were not compared with a control group but to established test norms. It was suggested that early illness was the most disruptive to the development of perceptual-motor ability. A visual-motor-perceptual training program, routinely administered to children with a history of chronic illness during the developmental period, might serve to facilitate visual-motor perceptual development and consequently facilitate early school success.

Instruments For Assessment

Increasing attention has been given to the study of tests and evaluation instruments designed to identify children with visual-perceptual lag and also to the training procedures designed to improve visual-perceptual ability. The usual standardized intelligence tests will be of limited usefulness. Attention must then be turned to other assessment techniques which have been recently designed to bridge this gap. These new tests yield information about the abilities essential for the child's academic program. Although tests and procedures vary, the unquestioned rationale, common to all of them, derives partly from the motor theory of perception, supported by Hebb[69] and Piaget and Inhelder[70] that "Perception is never separated from motor ability." Perception itself develops out of the sensory-motor behavior of infants and in small children depends to a great degree on exploratory movements. Minute eye movements are a pre-condition of form perception. While perception originates in motor behavior, it is also followed by motor events.

Assessment of the difficulties in visual perception has been beset by many difficulties.[71] Different tests used to assess this ability are not comparable. (e.g. Bender-Gestalt, Frostig's Developmental Test of Visual Perception, Winter Haven Lion's Children's Perceptual Achievement Forms. Various scoring systems with the same tests render the results non-comparable. (e.g. Bender-Gestalt). Some are tests of memory for designs rather than

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[69] D. O. Hebb, The Organization of Behavior as cited in Dr. Katherine Di Meo, Visual-Motor Skills: Response Characteristics and Pre-Reading Behavior (Winter Haven: Winter Haven Lions Foundation, Inc., 1967), p. 5.

[70] J. Piaget and Barbel Inhelder, The Child's Conception of Space, as cited in Dr. Katherine Di Meo, Visual-Motor Skills: Response Characteristics and Pre-Reading Behavior (Winter Haven: Winter Haven Lions Foundation, Inc., 1967), p. 15.

[71] Dr. Katherine Di Meo, Visual-Motor Skills: Response Characteristics and Pre-Reading Behavior (Winter Haven: Winter Haven Lions Foundation, Inc., 1967), pp. 1-87.

of copying: therefore they measure different factors. Measures of the outside criterion, that is the different tests of reading achievement, are not necessarily comparable. Developmental studies with age norms for certain outline drawings (Triangle) do not have comparable interpretations for "acceptable" reproductions.

Kappitz[72] explored the usefulness of the Bender-Gestalt Test as a screening tool for beginning first graders. Subjects were 272 beginning first graders from seven different schools. The Bender-Gestalt Test and/or Lee Clark Reading Readiness or Metropolitan Readiness Test were administered to the beginning first grade students. Test scores were correlated with each other and with actual achievement at the end of the school year. It was found that the Bender correlates well with the Readiness Tests and can predict actual achievement as well as they can.

Allen and Frank[73] suggested that the visual procedure involved with the Bender-Gestalt Visual-Motor Test may in and of itself influence the subjects' capacity to reproduce the designs accurately. The subjects are given model designs on four by six cards. Each design is to be copied on a sheet of paper, eight and one half by eleven inches. The field used for copying is different

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[72] Elizabeth M. Kappitz, "A Note on Screening School Beginners With the Bender-Gestalt Test," Journal of Educational Psychology LII (1961), pp. 80-1.

[73] Robert Allen and G.H. Frank, "Experimental Variation of the Mode of Reproduction of the Bender-Gestalt Stimuli," Journal of Clinical Psychology XIX (1963), pp. 212-14.

and is very quickly covered with all designs. The experimental administration of the Bender-Gestalt was devised to copy designs on a field identical in size, shape and axial orientation to the stimulus. Each design was copied on a separate card. The subjects in general were able to approximate the model design when drawing the designs in experimental conditions. The method of administration has serious implication - the subject will produce designs more accurately, even though some information on relationship of designs to each other is lost.

Although the existence of perceptual disabilities had been known for many years, and perceptual tests have been in use for some time, Frostig, Lefever, and Whittlesey[74] felt that only a few established age level norms and consequently the detection and diagnosis of difficulties in visual perception have not received adequate attention. They also noted that the "so called" intelligence test most commonly administered to the pre-school child (Stanford Binet), although testing a mixture of functions, is heavily loaded with perceptual tasks. The Stanford Binet, however, does not differentiate among the various perceptual factors, nor does it establish a set of perceptual norms.

To remedy these shortcoming, Frostig, Lefever and

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[74] Marianne Frostig, W. Lefever, and J.A. Whittlesey, "Developmental Test of Visual Perception for Evaluating Normal and Neurologically Handicapped Children," Perceptual and Motor Skills XII (November, 1961), pp. 383-94.

Whittlesey[75] constructed a screening device or instrument to identify school children with perceptual disabilities, to identify pre-school children - a device for normal, neurologically and mentally handicapped, for which developmental norms have been established. Perceptual quotients and age equivolents can be calculated in a manner similar to that used in calculating M.A. or I.Q. It is an easily administered test to an individual or group, with duration of forty minutes. The experimental test was given to 434 three years to eight and one half year old children, in a number of school districts. Five areas were tested: (1) Eye-hand coordination, (2) Figure-ground relationship, (3) Perception of form constancy, (4) Perception of position in space and (5) Perception of spatial relationships. In these areas, a clear evidence of age progression was found from three years to seven and one half, but with little development after. Certain weaknesses were found in the test: (1) a greater number of items needed in sub-test of figure-ground relationships and (2) ceilings should be higher.

Culbertson and Gunn[76] investigated the relationship between the Frostig Developmental Test of Visual Perception and Kappitz

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[75] Marianne Frostig, D.W. Lefever, and J.R. Whittlesey, "Disturbances in Visual Perception," Journal of Educational Research LVII (November, 1963), pp. 160-2.

[76] F. M. Culbertson and R. C. Gunn, "Comparison of the Bender-Gestalt Test and the Frostig Test in Several Clinical Groups of Children," Journal of Clinical Psychology XXII (February, 1966), p. 439.

scoring system for the Bender-Gestalt Test in predicting visual motor skills of abnormal clinical groups of children. Sixty-five subjects, aged 7.5 to 12.5 years, were tested individually with the Bender-Gestalt and Frostig. The significant correlation between the Bender-Gestalt and the I.Q. and the Frostig and the I.Q. show that the level of intellectual functioning is an important factor of visual perception. The significant correlation between Frostig and the Bender-Gestalt suggests that both tests are closely related and probably tapping many of the same visual perceptual variables. When both tests are used, chances of not being able to detect visual-motor disorders are small.

The Frostig Developmental Test of Visual Perception has been factor analyzed for the purpose of determining the effectiveness of the five subtests in measuring distinct visual perception abilities. Corah and Powell[77] and Allen[78] - although not in complete agreement do not support the assumption that the Frostig Developmental Test of Visual Perception measures five separate and independent abilities. Boyd[79] studied to determine whether

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[77] M. L. Corah and B. J. Powell, "A Factor Analytic Study of The Frostig Developmental Test of Visual Perception," Perceptual And Motor Skills XVI (January, 1963), pp. 58-63.

[78] Robert M. Allen, "Visual Perceptual Maturation and the Bender-Gestalt Test Quality," Training School Bulletin LXIV (February, 1968), pp. 131-3.

[79] Larry Boyd and Kenneth Randle, "Factor Analysis of the Frostig Developmental Test of Visual Perception," Journal of Learning Disabilities, III (May, 1970), pp. 253-8.

the Frostig Developmental Test of Visual Perception does in fact reflect essentially different and relatively independent abilities. He tested 94 first graders, five years, eight months to six years and eleven months. I.Q.'s 85 - 120: mean, 108. Results - The Frostig Developmental Test of Visual Perception measures essentially one general perceptual factor. Implications from these findings question the content validity of the Frostig Developmental Test of Visual Perception and suggest that the perception quotient be used as a unitary measure of perceptual functioning rather than cummulative measures of five independent visual perceptual abilities.

Another very useful instrument is the Illinois Test of Psycholinguistic Abilities, constructed by McCarthy and Kirk in 1961. Its goal is the detection of specific abilities and disabilities withing the subject, so that an educational or remedial program can be initiated on these findings.

Certainly the signs reflecting needed and significant information regarding the individual child are present to be read. We must meet the needs of every child with differential teaching methods based on specific learning handicaps.

CHAPTER III

CURRICULUM

A practical problem has been the programming of effective instruction to develop visual perceptual-motor skills. The following curriculum has been organized as units of programmed activities for pre-primary or pre-school children for the development and improvement of visual perceptual skills. This material should not be used in its' entireity for every child, but rather used prescriptively for a specific child for his specific need. It is programmed to learning needs, built around the individual's need or weakness. Many of the activities can and should be carried on with other modalities of learning, as auditory, haptic, and motoric. Learning in one perceptual modality cannot be discreetly separated from others. What a child learns visually influences the learning that occurs through listening and feeling. There is an interrelationship in all aspects of growth: development in any one perceptual modality is related to development in others.

The program should be flexible to accommodate changing needs, with variety to stimulate growth. The learning period should be short, but repeated often.

Objectives

I. Objectives:

A. To establish a stimulating environment to develop and strengthen visual perception.

B. To increase visual efficiency. (to sharpen visual acuity)

C. To establish a pattern of eye movement that is smooth and sequential.

D. To perceive quickly and accurately so as to develop skills in reading and spelling.

E. To provide an enriched environment to attain the stage of reading readiness.

F. To aid the development of language skills.

G. To establish patterns for logical thinking.

II. Specific Objectives:

A. To achieve eye contact to be able to focus on specific objects, people or activities.

B. To move eyes smoothly and easily, from left to right or horizontally and vertically without actual head movement.

C. To follow a moving target.

D. To develop eye-hand coordination.

E. To perceive figure-ground relationships.

F. To achieve perception of different shapes, forms and symbols.

G. To develop form constancy.

H. To develop skill in recognizing and identifying colors.

I. To learn and name primary and secondary colors.

J. To achieve recognition of identities (color, shape or size), similarities and differences.

K. To develop ability to conceptualize a totality: see things as a whole.

L. To be able to see parts - not always a whole picture.

M. To develop and strengthen visual memory.

N. To acquire own position in space and develop spatial relationships.

O. To achieve the ability to perceive directionality and laterality.

Units of Work

A. To achieve eye contact, to be able to focus on specific objects, people or activities.

A child cannot really see if his eyes cannot be quickly and economically centered on a given object. The child learns that when his eyes are pointed in a given direction, this means that the object lies in that same direction.[1]

1. Personal eye contact with individuals, such as the instructor, obtained by using singing, music or peek-a-boo.

2. Eye focus on objects such as toys. (top, bells, ball or puppet.)

3. Learning of facial features.

4. Finding the holes in a pegboard and inserting pegs.

5. Connecting pop beads.

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[1] Dr. Newell C. Kephart, The Slow Learner in the Classroom (Columbus, Ohio: Charles E. Merrill Books, Inc., 1960), p. 47.

6. Using an animal such as a dog, horse or donkey; put the tail or leg in the proper place. Flannel boards or chalkboards are suitable backgrounds.

7. Fitting puzzle pieces into the correct outlines.

8. Fusion of lines when writing letters as in "A" "V."

B. To move eyes smoothly and easily from left to right horizon- (later on) - (between C + D) tally or vertically, without actual head movement.

C. To follow a moving target.

A child must have accurate control of the eyes, an accurate match between the eye movements and perceived visual stimulus, and an adequate interrelationships between the movement of the eyes and the movements of other muscle groups in the body. Such matching can become very complicated and must be built up with great accuracy.

The control of the eyes is very intricate and precise. The eyes are moved by six outside ocular muscles which must be stimulated into patterns which must be moved very accurately. The fovea is a narrow area (about two millimeters in diameter) at the back of the eyeball. For most efficient vision, the image must fall on this foveal area. In order to focus the image on this restricted area, the eye must be moved with extreme precision. For this reason, and because of the intricacy of the muscle system by which the eye is moved, the process of learning to control this movement is very difficult. The young child has difficulty in learning to control the movements of his eyes. He is not able to direct them accurately toward an object which has attracted his attention, nor is he able to keep them focused on a moving object. His eyes move in a jerky and uncontrolled fashion. The child must learn how to generate a pattern of neurological impulses which will control this mechanism with precision.

1. Move any toy, such as a top or ball, horizontally and vertically or in a circular motion, encouraging the child to follow the movement with his eyes. This can be done, incidentally, in any activity or learning task.

2. Using a pencil with a $1\frac{1}{2}$ inch long paper streamer ("airplane") thumbtacked to the eraser, have the child keep his eyes on the "plane." To follow a circle, ask the child to fasten his seat belt and follow a nose dive. Vary the airplane with a seasonal decoration. Watch the child to see if only the eyes are moving or if the head is moving also. If the head moves, hold the top of the head gently, so that the child can feel the pressure of your hand and concentrate on following with his eyes only.[2]

3. Follow a flash light beam in a darkened room.

4. Using a large ball at the beginning of training, roll the ball back and forth - child to instructor - tracking the ball.

5. Follow the progress of a ping-pong ball on a chalk tray.

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[2] Dorothy M. Simpson, Learning to Learn (Columbus, Ohio: Charles E. Merrill Publishing Co., 1968), p. 28.

Once child will blow the ball along the tray and the other children will follow the progress of the ball.

6. Waving bright colored large flags. These would be able to be moved at some distance from the child - thus encouraging smooth eye span at a greater distance.

7. Using a puppet, dramatize activities or stories with much movement from left to right, and up and down.

8. Using an opaque projector, children follow an arrow from object to object or pictures on a map. Following a trail designated by the arrow is also good training.

9. Using a taped line on the floor (with an arrow from left to right), arrange objects on the line working from left to right.

10. Place pegs in the pegboard, beginning at left side of board and completing each row.

11. Arrange two chairs ten to twelve feet apart. Look at the left chair. Point to the right chair and have the child move eyes. Do it slowly at first, then increase speed.

12. Put an object in the center of a table. Look at the object and then at a specified corner and then back to the object. Repeat for each corner. Using a puppet to give directions will add to the interest of the game.

13. Follow and connect dots. On the chalkboard draw designs or figures which the children connect.

14. Playing tether ball.

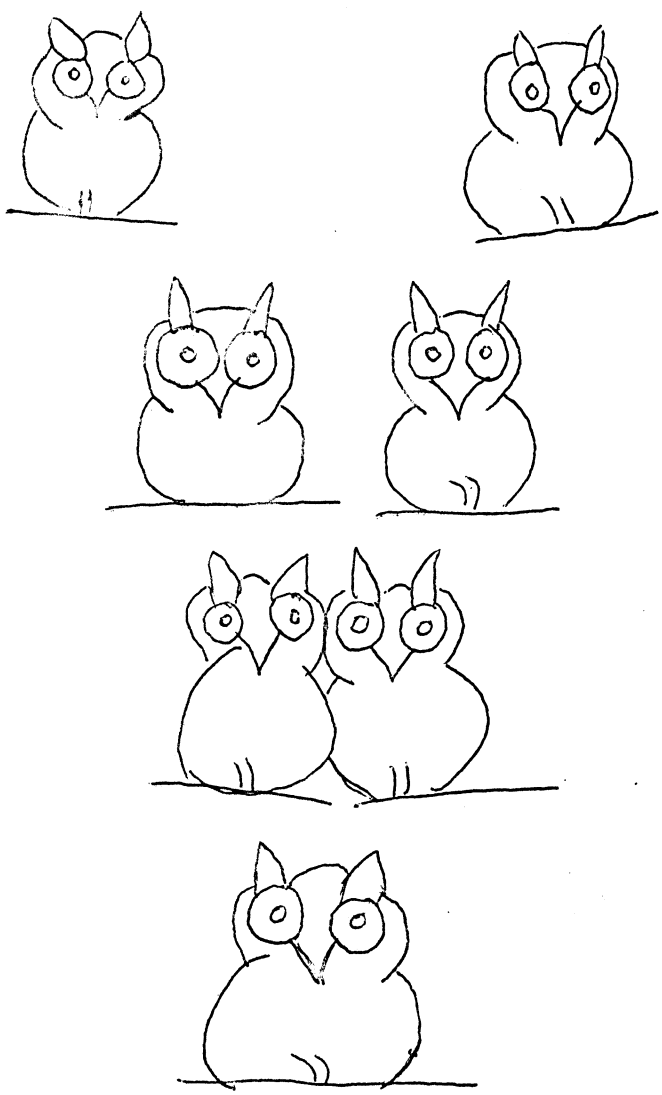
15. Following the progress of a ball attached to a paddle.

16. Matching stick forms.

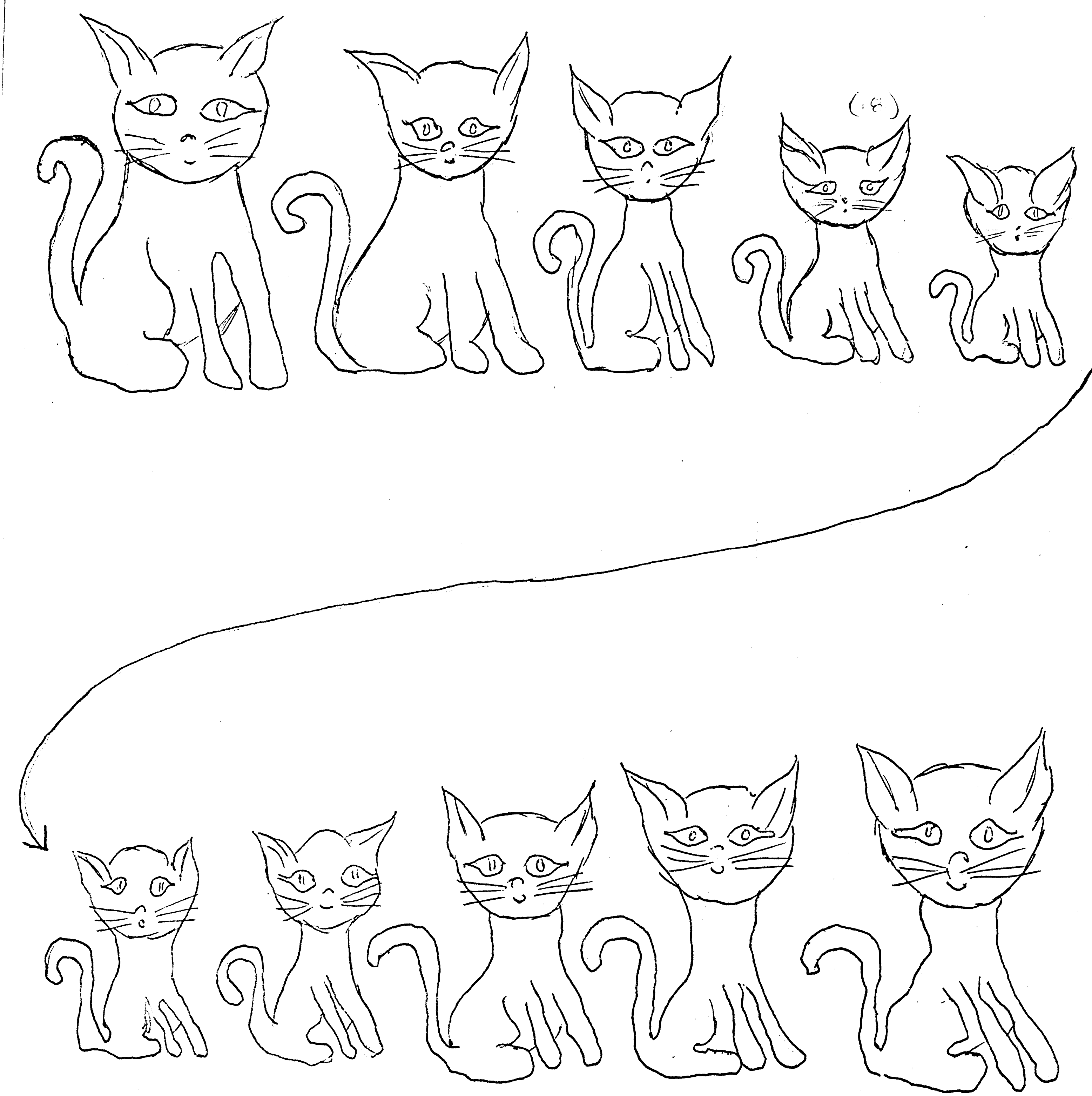
17. Following a maze on a blackboard.

18. Using the strip of cats on page 58, point to the large cat on the left and say, "Your eyes will go across to the little cat. Don't move your head, only your eyes. Follow the arrows to the next line. Follow the cats across to the big one. This is the way your eyes move when you are reading."

19. So that a child is able to look up from a book and then back to his place, his eyes must be trained to converge.



With a slip of paper cover all but the two owls at the top. Have the child look at them as you look and discuss them. Move the paper down to the next pair of owls, saying, "These owls are closer together. Move your eyes downward as I slide the paper. These owls are closer together." Move paper gradually down until only one owl remains.



D. To develop eye-hand coordination.

"One of the ways to evaluate a child's visual perceptual skill of eye-hand coordination is to have him draw what he sees."[3]

1. Using the pencil airplane described previously, ask the child to "take the controls." Tell him to put his finger on the plane and move his finger with the moving plane. Along with his finger he should also follow the plane with his eyes. Take note if the head is moving. Have the child try to catch the plane the moment it stops.

2. Fitting different shaped discs into corresponding holes.

3. Dropping pegs through a hole in the cover of a container.

4. Fitting round plastic rings on a wooden dowel.

5. Puzzles.

6. Pusing a toy vaccum cleaner or musical push toy along a designated path.

7. Stringing beads. Begin activity using large plastic rings with large holes. After success has been attained, use the smaller wooden beads.

8. Hitting nails on a pounding board.

9. Fitting pegs into a pegboard.

10. Dialing a telephone.

11. Matching and sorting geometric forms.

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[3] W. M. Cruickshank, et al., A Teaching Method for Brain Injured and Hyperactive Children (Syracuse: University Press, 1961), p. 138.

12. Wooden threading block.

13. Cutting

    a. Divide a long strip of paper into squares using a black magic marker. Cut on the heavy black lines. In this activity, not only is there good eye-hand coordination training, but as the child cuts he is able to see what he has cut.

    b. Cutting on a straight heavy line - first on a line between two pieces of cardboard. Then remove one piece of the cardboard and cut on the line. Remove the remaining piece of cardboard and cut on the line.

14. Pasting

    a. Pasting a colored circle or a Valentine heart on a large X on paper. In other words, hitting a target.

    b. Using a picture as a pattern, paste identical objects on child's paper in same order or arrangement. Begin with two objects.

15. Coloring within lines or boundaries.

16. Copying geometric forms.

17. Tracing letters or numbers using templates.

18. Tracking a ball.

19. Copying a sequence pattern. On a taped line on the floor, set up a pattern such as a square, a circle, a triangle and a hexagon. The student is to arrange his objects in the same order on the line.

20. Block or pegboard designs.

21. Parquetry designs.

22. Drawing squares, circles and triangles on the blackboard, in the air and on large sheets of paper on the floor.

23. Following or connecting dots.

24. Throwing balls through a large hole into a box.

25. Playing "Ring Toss" game.

26. Fitting graduated nested objects together.

27. Tracing letters or numbers on a magic slate.

28. Following a pattern of stringed beads.

29. Using an overhead projector, project a simple maze on the chalkboard. Have the child draw a chalk line through the center without touching either wall. The size of the maze can be altered by moving the projector closer to or farther away from the chalkboard.

E. To perceive figure-ground relationships.

Figure-background disturbance is the tendency of some children to confuse figures and background. Many brain-injured children seem to have particular difficulty in separating a significant stimulus from its distracting background. The figure and background are perceptually independent. They are not two separate entities. The unique characteristics of the figure are determined by its relationship to its background.

A figure-ground perceptual response possesses two major characteristics: (1) The figure is perceived to have a form while the ground is relatively formless. (2) The figure is perceived to stand out against the background.

A child who has difficulty in figure-ground relationship may not see words on a page because his attention is attracted to pictures or numbers. Or the background may be lost to something in the foreground as is shown in this example: In a picture of a yellow church with a tiny blue window, a child with a figure-ground disability will identify the color of the church as "blue."

1. Help the child to focus his attention on a specific object when it is within its natural context - be it classroom or outdoors. (not a workbook)

2. Using a realistic picture, ask the child to focus his attention on a particular object within a scene and to discuss its relationship with other objects therein. The shift from one object to another further develops figure-ground relationship.

3. Designs on a pegboard.

4. Block designs.

5. Detecting hidden figures in puzzles.

6. Parquetry designs.

7. Tracing stencils.

8. Matching like pictures.

9. Discriminating between intersecting lines.

10. Coloring all the squares in a design.

11. Selecting some of the workbook pages that are available. Do not use every page for each child.

12. Playing a game by asking the child to select one specific toy from a group.

13. Place one block on the table and three blocks on the floor. Ask the child what is different.

14. Bean bags.

F. To achieve perception of different shapes, forms and symbols.

G. To develop form constancy.

"Difficulty in reproducing visually perceived forms has often been considered a characteristic of brain-injured children."[4]

1. Draw squares, triangles, circles or symbols on the chalkboard. Trace. Draw in the air, in a sand box or on the floor.

2. Walk the shapes of a triangle. Do the same with a square on the floor or playground.

3. Trace the shapes or symbols on chalkboard or paper using a template or stencil.

4. Using the overhead projector, project forms or symbols on chalkboard. Trace or color. One advantage in using the overhead is that errors may be identified, erased and corrected immediately.

5. Detecting squares and circles among other forms or picking specific letters. Again, the overhead could be used.

6. Manipulating forms and examing closely. Always name each form, shape or symbol to develop the association of form and name.

7. Separating forms or symbols into like groups.

8. Play the game, "Fish."

9. Puzzles. Simple puzzles can be constructed by the

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[4] Ibid., p. 138

teacher for training. Mounting a simple picture on cardboard and then cutting it horizontally in half involved matching the picture. As the child becomes more proficient, the picture could be cut into four or more equal pieces or simple geometric forms could be used.

10. Match sticks used to construct simple gwometric forms or figures.

11. Pegboards. Pegboards present a somewhat more difficult form perception problem. The form is broken up into a large number of units and it takes much time to place the pegs in a pegboard. If a child has only recently learned to differentiate between forms he should not be given a design that is colored. Placing a template over a pegboard on which was drawn a colored intricate design requires nothing more of a child than to match a colored peg with a hole of that color. No judgment is required.

12. Paper forms.

a. Cut blue squares, red circles, and green triangles. Mount, mix and sort according to shape.

b. Cut yellow squares, orange circles, and purple triangles. Mount, mix and sort according to shape.

c. Cut squares, circles and triangles all the same color. Mount, mix and sort.

13. Dominoes - numbers.

14. Lotto - forms, letters, numbers.

15. Sorting box for geometric forms.

16. Cutting and pasting of forms.

17. Matching shapes and symbols on flannel board.

18. Parquetry designs. If a child cannot differentiate between geometric forms, practice walking out designs and then hold up a parquetry design for the child to duplicate by walking. Start with an uncolored design with two forms.

H. To develop skill in recognizing and identifying colors.

I. To learn and name primary and secondary colors.

"It has been found that color perception and responsiveness to color remains intact in spite of the severest disturbance of perceptual and general integration."[5] Thus the teacher can rely heavily on color as a means of reaching children.

1. Identifying colors - always building up the association of color and name.

2. Matching colors on the pegboard. Tape a line dividing the pegboard in half. Put red pegs on one side and blue on the other.

3. Asking a child to select a specific colored object from a tray or box.

4. Matching pop beads of the same color.

5. Stringing beads of identical colors.

6. Matching colored blocks to cardboard block designs.

7. Dominoes - two inch squares mounted on cardboard.

8. Lotto - colors.

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[5] A. A. Strauss and Dr. N. C. Kephart, Psychopathy and Education of Brain-Injured Children as cited in W. M. Cruickshank, et al., A Teaching Method for Brain-Injured and Hyperactive Children (Syracuse: University Press, 1961), p. 137.

9. Color Bingo.

10. Paint muffin tin cups various colors. Sort chips or pegs to match colors.

11. Puzzles.

12. Sequence patterning of colors on taped line on floor, working from left to right.

13. Block designs.

14. Parquetry designs.

15. Following directions in coloring outline forms.

J. To achieve recognition of identicals, similarities and differences.

1. Place several objects on a tray, having one matched pair. Have child select two that are alike.

2. Select two different objects from a group of remaining identical objects.

3. Select two animals from an assorted group.

4. Match pictures.

5. Three birds and a ball are put on the flannel board. Find the one that is different.

6. Matching pairs from a group of six or eight pairs. Give the child an individual small sheet of black construction paper on which to match pairs.

7. Match small cut-outs to the same picture appearing on a larger sheet.

8. Using the overhead projector, project matched pairs on

the chalkboard or screen. Using a cardboard frame, pinpoint one design at a time. Have a child find the design that matches the framed one. Set a time limit.

K. To develop ability to conceptualize a totality - see things as a whole.

> Disassociation is the inability of the child to conceptualize a totality. i.e., the inability to see things as a whole or as a unity. The child tends to respond to a stimulus in terms of parts or segments. He has marked difficulty putting two or more parts together into a relationship or a whole.[6]

1. Puzzles.

2. Pegboards.

3. Parquetry designs.

4. Block designs.

5. Cutting.

6. Copying geometric designs.

7. Completing geometric designs.

8. Use a very simple picture, as one of an apple. Study this picture carefully. Then cut an identical picture in half. Put the two parts together to create a "whole." This may be carried out by cutting other identical pictures into thirds, quarters or fifths.

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[6] W. M. Cruickshank, et al., A Teaching Method for Brain-Injured and Hyperactive Children (Syracuse: University Press, 1961), p. 5.

L. To be able to see parts, not always a whole picture or object.

1. Pop beads.

2. Puzzles.

3. Stringing beads.

4. Linking three cubes into a rod and then separating into three distinct parts.

5. Using a geometric figure, as a circle (could be a pie), cut a wedge from it to show the circle is made up of parts.

6. What part is missing? On a flannel board construct a flower, composed of stem, leaves and blossom. Remove one part and ask what is missing.

M. To develop and strengthen visual memory.

> Any response of the organism involves not only the present stimulating activities, but effects of past activities as well. The further elaboration of the present stimulus situation by the addition of pertinent data from our past experiences invests the present experience with meaning.[7]

1. For young children, dramatizing songs or finger plays after a demonstration by the teacher.

2. Stacking of blocks in pyramid patterns.

3. Pasting small pictures in same pattern as had been demonstrated.

4. Folding a piece of paper in half, ask the child to

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[7] Dr. Newell Kephart, The Slow Learner in the Classroom (Columbus; Charles E. Merrill Books, Inc., 1960), p. 39.

do the same and then draw a picture in each half.

5. Identifying the name tag that belongs to a child. Change order occasionally to be sure it is the specific tag he remembers and not the location.

6. Reproducing a circle or triangle on chalkboard.

7. After looking at familiar objects on a tray or table carefully, have the child turn his back and name as many as possible.

8. Remove one object from the previously mentioned tray. Who can identify it?

9. Draw a simple pattern on the chalkboard or use the overhead projector and flash on board. Erase or remove and have child reproduce it.

10. Place figures or objects on a flannelboard. Remove. Have one child replace them in same position or pattern.

11. Show a picture of a child either running, crawling or hopping. Turn it over. Ask someone to do what he saw on the picture.

12. Reproducing patterns made on pegboard.

13. Using small blocks, construct a design. Remove design and ask someone to reproduce it.

14. Identifying name card.

15. Write names on work pages before activity. Pupils must recognize their name to get papers.

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N. To acquire own position in space and develop spatial relationships.

"Perception of position of the body is an integral part of the visual world."[8] Without body awareness there will be no development of spatial organization at a level enabling one to learn to read. Reversals in reading and writing are considered an indication of a poorly developed spatial organization ability.

1. Parquetry designs.
2. Block designs.
3. Pegboard.
4. Coloring.
5. Puzzles.
6. Copy patterns by linking dots.
7. Detecting reversed or rotated figures in sequence.
8. Constructing models.
9. Using the overhead projector, project a simple picture and draw a chalkboard frame around it. After a child has studied the picture, shut off the machine. Then ask him to place marks within the chalk frame where he thought certain items appeared in the original picture. Turn projector on to evaluate his success.
10. Finger painting.
11. Copying sequential patterns on a taped line.

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8 W. Taylor, as cited in T. N. Gould, "Visual Perception Training: Vision-Motor Perception Program," Elementary School Journal LX (April, 1967), pp. 381-9.

0. To achieve the ability to perceive directionality and laterality.

Before a child can begin to draw a square, he must be able to distinguish between his left side and his right side, and control the two sides of his body separately and simultaneously. Laterality leads to directionality.[9] One very important factor in the development of directionality is the control of the eyes. When a child has learned this control, he matches the movement of his eye to a movement of his hand and thus transfers the directionality information from the kinesthetic pattern in his hand and arm to the kinesthetic pattern in his eye.[10]

1. Sorting objects (left and right).

2. Sequence patterns. Use a taped line on the floor working on your sequence from left to right.

3. Cutting.

4. Copying geometric forms.

5. Drawing "lazy eights" and other simple figures on the chalkboard.

6. Prepare a chart showing a giraffe facing left and a giraffe facing right. Ask children to explain what is different.

7. Teacher stands at chalkboard beside the child. He places a dot on the board. The child places his chalk on this dot and

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[9] Dr. Newell Kephart, *The Slow Learner in the Classroom* (Columbus: Charles E. Merrill Books, Inc., 1960), p. 23.

[10] *Ibid.*, p. 47.

when the teacher has placed another dot, he draws to this dot. Continue this, with the teacher always waiting until the child has drawn his line before placing the next dot. This can be used with children who have not learned to count.

8. Walking board.

CHAPTER IV

CONCLUSION

Perception has been defined as an immediate interpretation of incoming sensory information. From birth, the individual builds up a store of perceptual experiences which later become internalized and form the foundations for concepts. From the review of the recent literature, there appears to be a developmental patterning in visual perception. If a child has a rich fund of necessary perceptual experiences from which to draw, he will be in a position to recall images internally without having to resort to direct sensory clues. Another conclusion that is relevant to the problem is that a significant improvement in visual perception skills is achieved with perceptual training.

Visual perception is the ability to discriminate and identify visual stimuli; or in simpler terms, the act of looking and knowing what you see. Visual perception develops maximally between three to seven years of age. It is important that there be no developmental lag in the sequential stages of visual skills - in both the normal and the learning-disabled child. From the evidence presented, visual-motor skills can be developed and visual-motor skills instruction increases the level of achievement.

"Reading involves the visual perception of written symbols and the transformation of the symbols to their explicit or implicit oral counterparts."[1]

Reading, as a perceptual-motor task, appears to require a complex set of visual skills from discrimination, saccadic eye movement between fixation points, central vision responses to peripheral vision signals. Most of the studies concerning visual perceptual skills were only successful to a limited degree because of the controls set up. Certain factors, such as eye-hand coordination, pattern copying, reversals, fusion, lateral and vertical eye balance and space, showed significant correlation to reading scores.

Although assessment instruments for visual perceptual difficulties have been beset by many difficulties, tests are available, and the test results are necessary for the individual child's academic program. The Bender-Gestalt correlates well with the Readiness tests and can predict achievement. There is significant correlation between the Frostig Developmental Test of Visual Perception and the I.Q. and the Bender-Gestalt and I.Q. which suggests both are closely related. Assessment or evaluation is necessary for all children but especially the "mentally retarded or borderline."

Findings in this paper are in accord with Piaget's developmental theory of perception; with age and the development of new

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[1] T. C. Barnett, "The Evaluation of Children's Reading Achievement," (Newark: As presented to the International Reading Association, 1967), p. 15.

mental structures, the child's perception is progressively freed from its dominance by field effects and becomes increasingly logical in form.

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